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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/494,211	01/25/2000	Il-Ki Woo	003364.P035	3154

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EXAMINER

DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/494,211

Applicant(s)

WOO ET AL.

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the communication filed on 10/18/04. Applicant's arguments have been considered, but are not persuasive. Claims 3-32 are pending and claims 1-2 have been canceled.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/18/04 has been entered.

Claim Objections

Claims 11-13 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The weight percentages of claims 11-13 are contained in claim 4.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3-31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant

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art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 3 has been amended to recite a Cu-alloy comprising at least boron or cobalt and further comprising at least one of nickel, titanium, magnesium, tin, zinc, chromium, manganese, iron, vanadium, aluminum, zirconium, niobium, bismuth, lead, silver or misch metal. Claims 4 and 19 have been amended to recite a Cu-alloy comprising at least boron or cobalt and further comprising at least two of nickel, titanium, magnesium, tin, zinc, chromium, manganese, silicon, iron, vanadium, aluminum, zirconium, niobium, phosphorous, bismuth, lead, silver or misch metal. Claim 26 has been amended to recite a Cu-alloy comprising at least boron or cobalt and further comprising at least two of nickel, titanium, magnesium, manganese or zinc.

However, the specification does not provide support for the specific copper alloy compositions claimed in claims 3, 4, 19 and 26. Specifically, the specification does not disclose a copper alloy containing boron or cobalt and at least one other metal. There is no specific disclose in the specification of a copper alloy containing boron or cobalt and at least one other metal.

Furthermore, the specification does not even teach boron or cobalt are preferred for the copper based alloy. Thus, it does not appear that applicant had possession of the claimed invention.

Claims 3-31 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a Cu-based alloy comprising at least one material selected from the group consisting of nickel, titanium, magnesium, tin, zinc, chromium, manganese, iron, vanadium, aluminum, zirconium, niobium, bismuth, lead, silver, cobalt, boron or misch metal, does not reasonably provide enablement for a Cu-based alloy comprising at least boron or cobalt and further comprising at least one of nickel, titanium, magnesium, tin, zinc, chromium, manganese, iron, vanadium, aluminum, zirconium, niobium, bismuth, lead, silver or misch metal.

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The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites weight percentages of the materials that may be alloyed with copper to produce the Cu-based alloy. However, it is unclear if the weight percent limitations for the various elements are part of the claimed invention. Claim 3 recites zinc, iron, aluminum or misch metal may be the "at least one material" of the copper based alloy. However, weight percentages are not provided in the claim for these four materials.

Claim 4 recites weight percentages of the materials that may be alloyed with copper to produce the Cu-based alloy. However, it is unclear if the weight percent limitations for the various elements are part of the claimed invention. Claim 4 recites zinc, silicon, iron, aluminum, phosphorous or misch metal may be one of the "at least two materials" of the copper based alloy. However, weight percentages are not provided in the claim for these six materials.

Claim 19 recites weight percentages of the materials that may be alloyed with copper to produce the Cu-based alloy. However, it is unclear if the weight percent limitations for the various elements are part of the claimed invention. Claim 19 recites zinc, silicon, iron,

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aluminum, phosphorous or misch metal may be one of the “at least two materials” of the copper based alloy. However, weight percentages are not provided in the claim for these six materials.

Claim 26 recites weight percentages of the materials that may be alloyed with copper to produce the Cu-based alloy. However, it is unclear if the weight percent limitations for the various elements are part of the claimed invention. Claim 26 recites zinc may be one of the “at least two materials” of the copper based alloy. However, a weight percentage is not provided in the claim for zinc. Furthermore, weight percentages are provided for tin, chromium, vanadium, zirconium, niobium, bismuth, lead and silver, but these elements are not listed as materials for the “at least two materials”.

Claim 32 recites weight percentages of the materials that may be alloyed with copper to produce the Cu-based alloy. However, it is unclear if the weight percent limitations for the various elements are part of the claimed invention. Claim 32 recites misch metal may be one of the “at least one material” of the copper based alloy. However, a weight percentage is not provided in the claim for misch metal. Furthermore, weight percentages are provided for tin, chromium, manganese, zirconium, lead and silver, but these elements are not listed as materials for the “at least one material”.

To the extent the claims are understood in view of the 35 U.S.C. 112, 1st and 2nd, rejections above, note the following prior art rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 32 is rejected under 35 U.S.C. 102(b)/103(a) as being anticipated by, and alternatively unpatentable over, Ohashi et al., WO 97/32347.

Ohashi teaches a lithium battery comprising a cathode, an anode, a separator between the cathode and the anode and an electrolyte (page 6, lines 8-14). The cathode includes a paste containing LiCoO_2 coated on a foil current collector. The negative electrode includes a carbonaceous material coated on a current collector. The collector for both electrodes (anode and cathode) may be a metal foil and is preferably made of a metal which does not easily produce an alloy with lithium such as iron, nickel, cobalt, copper, titanium, vanadium, chromium, manganese or one of their alloys (page 2, lines 26-33; Example 1). Example 1 teaches a copper foil current collector for the anode having a thickness of 20 μm .

Thus the claim is anticipated.

The claim is alternatively unpatentable. The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious (In re Fessman). Thus, the limitation "produced by a plating process" is considered obvious in view of the prior art. See MPEP 2113.

Claims 4-6, 26, 27, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirai et al., US 5,368,958.

Hirai teaches a rechargeable lithium battery comprising an anode, a cathode, a separator and an electrolyte (4:45-50). The cathode active material may be a lithium transition metal oxide compound (4:61-5:2). The anode active material may be lithium, lithium alloys or lithium intercalation compounds such as various kinds of carbon materials (4:31-36). The anode further contains a metal, alloy or composite foil comprising an alloy having at least two materials selected from the group consisting of Cr, Cu, Au, Ag, Al, In, Fe, Pb, Mn, Zn, Cd, Ti, Co, Ni and Sn. The foil has a thickness of from 5-500 μm (4:8-17). Example 1 teaches a copper foil with a thickness of 9 μm as the anode current collector.

Hirai does not explicitly teach a copper alloy comprising at least boron or cobalt wherein the alloy further comprises at least one of Ni, Ti, Mg, Sn, Zn, Cr, Mn, Fe, V, Al, Zr, Nb, Bi, Pb, Ag or misch metal.

However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Hirai teaches a copper alloy foil may be used as the anode current collector. Hirai teaches that copper may be alloyed with materials such as Co, Ni, Sn, Zn, Cr, Mn, Fe, Al, Pb or Ag. Thus, Hirai suggests a copper alloy foil wherein the copper alloy comprises Co and at least one additional material such as Ni, Sn, Zn, Cr, Mn, Fe, Al, Pb or Ag. Hirai does not disclose any specific alloy compositions. However without any showing of critically, the claimed Cu-based alloy foil is considered obvious in view of Hirai

The courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious (In re Fessman). Thus, the limitation “produced by a plating process” is considered obvious in view of the prior art.

Response to Arguments

Applicant's arguments filed 10/18/04 have been fully considered but they are not persuasive.

35 U.S.C. 112, 1st

Applicant argues that boron and cobalt are listed as additive elements and therefore a copper alloy containing boron and cobalt and at least one other metal is clearly supported in the original specification even if the copper alloy is not specifically asserted. Examiner disagrees. The specification must provide support for specific combinations of elements contained in the copper alloy. Examiner points out that Applicant has not addressed the scope of enablement rejection of claims 1-31. The specification must enable one of skill to make and use the claimed invention. The specification does not enable one of skill to specifically pick boron or cobalt and at least one other disclosed metal for the alloy components of the copper-based alloy.

35 U.S.C. 112, 2nd

The amendment filed 10/18/04 overcomes the previous 35 U.S.C. 112, 2nd, rejection of claims 15-18. However, claims 3-32 are newly rejected under 35 U.S.C. 112, 2nd.

Ohashi

Applicant argues Ohashi does not teach or suggest a Cu-based alloy is produced by a plating process into a foil shape. However, the courts have ruled that product-by-process limitations, in the absence of unexpected results, are obvious (In re Fessman). Thus, the

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limitation "produced by a plating process" is considered obvious in view of the prior art. Any evidence of unexpected results must clearly distinguish the claimed invention over the prior art. Applicant mentions the binder of Ohashi, however, the binder is not part of the collector. The electrode active material layer comprises the binder. Since the claimed invention does not exclude a binder for the active material (carbon or SnO_2), it is unclear how this argument applies to the rejection in view of Ohashi.

Applicant argues the plating method for the copper alloy foil of the claimed invention improves strength over pure copper. However, unexpected results must distinguish the claimed invention over the prior art. Since Ohashi teaches a copper alloy, this argument is not persuasive.

Takagi

The amendment overcomes the 35 U.S.C. 102(a) rejection of claim 32 in view of Takagi. The foreign priority documents provide support for the claimed invention, thus, Takagi is not available as prior art against the claimed invention.

Hirai

Applicant argues the conductive foil disclosed by Hirai is made of copper, and therefore, Hirai does not teach or suggest a Cu-based alloy where Cu is the main component. It is unclear how Applicant reaches this conclusion. As stated on page 6 of the final rejection, Hirai teaches a copper alloy foil may be used as the anode current collector. Hirai teaches that copper may be alloyed with materials such as Co, Ni, Sn, Zn, Cr, Mn, Fe, Al, Pb or Ag. Thus, Hirai suggests a copper alloy foil wherein the copper alloy comprises Co and at least one additional material such as Ni, Sn, Zn, Cr, Mn, Fe, Al, Pb or Ag. Hirai does not disclose any specific alloy compositions.

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However without any showing of critically, the claimed Cu-based alloy foil is considered obvious in view of Hirai. Note the 35 U.S.C. 112, 2nd, rejection above regarding the weight percentages recited by the claimed invention. Note weight percentages are not provided for at least zinc and aluminum.

Applicant argues the plating method for the copper alloy foil of the claimed invention improves strength over pure copper. However, unexpected results must distinguish the claimed invention over the prior art. Since Hirai teaches a copper alloy, this argument is not persuasive.

Note that if the claims are amended to remove the new matter and overcome the scope of enablement rejection, the previous prior art rejections may be reinstated.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745

November 29, 2004